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An Analysis of the Behaviour of Prime Lending Rates in Sri Lanka

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Abstract

The prime lending rate is the rate at which commercial banks loan funds to their most creditworthy customers, and hence, is usually lower than other market lending rates; reason why it is considered a "base or reference rate". In Sri Lanka, the Central Bank of Sri Lanka (CBSL) has been compiling the Average Weighted Prime Lending Rate (AWPR) since January 1986. This paper examines the determinants of prime lending rates in Sri Lanka using weekly data from January 2004 to June 2013, while attempting to capture any asymmetries in prime rate changes to monetary policy decisions. Empirical evidence suggests that the prime rate is highly persistent, while the call money rate also remains a key determinant. However, domestic liquidity was statistically insignificant and even if it was, it has only a marginal impact in determining the prime lending rate. Furthermore, there is also evidence of asymmetric adjustment in AWPR.

Keywords: Prime lending rate, AWPR, Asymmetries, Persistence, Sri Lanka.
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Contents

1. Introduction

1.1. The Prime Lending Rate and its Importance?

Financial intermediation, which involves transfer of funds from surplus units (i.e., savers or lenders) to deficit units (i.e., borrowers) of an economy, is traditionally, the primary activity of banking institutions worldwide. Banks, or financial intermediaries for that matter, mobilise deposits and lend the same to customers who require, but short of funds. The loaning of funds will be at different rates of interest determined by those individual banks, which depends on various factors such as the type, size and creditworthiness of the customer, term and purpose of the loan, *inter alia.*

The prime lending rate (herein referred to as the prime rate), as the name implies, is the rate of interest charged by banks from their most creditworthy and/or high net worth clients for short-term loans. Since the likelihood of prime customers defaulting on loans are minimal, the rate of interest charged by banks on prime lending would be relatively lower compared to that charged from non-prime customers. Due to this reason, the prime rate is usually considered to be a "base or reference rate" that banks use to price other types of loan products offered by them for both personal and commercial purposes. Further, according to Dueker and Thornton (1994) business corporates use the prime rate as a benchmark to evaluate their own creditworthiness.

1.2. The Prime Lending Rate in Sri Lanka: AWPR

1.2.1. Historical Background

The Central Bank of Sri Lanka (CBSL) has been publishing the Average Weighted Prime Lending Rate (AWPR) since 1986, based on the information collected by commercial banks on prime lending. This has been used as an indicator of the average lending rate charged by commercial banks from their most creditworthy customers, predominantly on short-term loans.

Since the commencement of compiling and publishing of AWPR, it has served as a guiding indicator to the financial institutions as a benchmark lending rate as it offered a clear reflection of short-term money market interest rates. More importantly, AWPR was used as a leading indicator interest rate by the CBSL to monitor the impact of monetary policy measures and the monetary policy transmission mechanism.

1.2.2. Current Practice and Compilation Methodology

The banking system in Sri Lanka consists of the Central Bank of Sri Lanka (CBSL), which is the monetary authority and 33 other banks (by end June 2013), of which 24 are licensed commercial banks (LCBs) while the rest are licensed specialised banks (LSBs). Both LCBs and LSBs cater to the public, which includes customers from individuals to large corporates. Both these institutions have their prime as well as ordinary customers when it comes to lending and every individual bank determines the rate to be charged on loans from their prime customers, which is the prime rate of that particular bank.

Based on the information provided by all commercial banks on new lending (which are usually on a short-term basis) to their prime customers during the week, the CBSL compiles the AWPR on a weekly basis, which is subsequently communicated to the public via their official website, along with bankwise AWPR.

The formula to calculate the AWPR is as follows:

$$\text{AWPR}= \frac{\sum_{i=0}^{n}(m \times r)}{\sum_{i=0}^{n}(m)} \tag{1}$$

where,

m = Amount of new loans

r = Interest rate

n = No. of new loans

The guidelines[1] on reporting transactions for the compilation of AWPR are as follows:

i. Interest rates applicable to the ten lowest cost borrowers in respect of overdrafts and other short-term advances, which have an original maturity of three months or less and which have been re-priced or disbursed during the week, along with the relevant outstanding amounts are to be reported.
ii. Only interest rates pertaining to domestic rupee operations with the private sector customers are to be reported.
iii. Credit to government corporations and departments are to be excluded.
iv. Advances granted to prime customers, i.e., most creditworthy customers who are in the top tier of each bank's risk grading grid are to be reported and not the advances granted to prime sectors such as exports, agriculture, etc.
v. Subsidised lending including refinance loans are to be excluded.
vi. Advances that are fully secured by cash deposits or government securities are excluded.
vii. Call money-market transactions are excluded.
viii. Interest rates on unadvised credit lines and penal interest rates are excluded.
ix. Only transactions above Rs. 10 million are to be reported.

The significance of AWPR in Sri Lanka has increased in the recent years as it has been increasingly used by almost all commercial banks as a base rate in place of other short-term market interest rates such as the 91-day Treasury bill rate or the Sri Lanka Interbank Offered Rate (SLIBOR) when pricing their loans. Thus, the prime rate is considered to be one of the most important interest rates in Sri Lanka, especially for large corporates, as changes in the prime could affect their cost of funds and ultimately the profitability of their business ventures.

[1]The guidelines are issued by the Economic Research Department of CBSL.

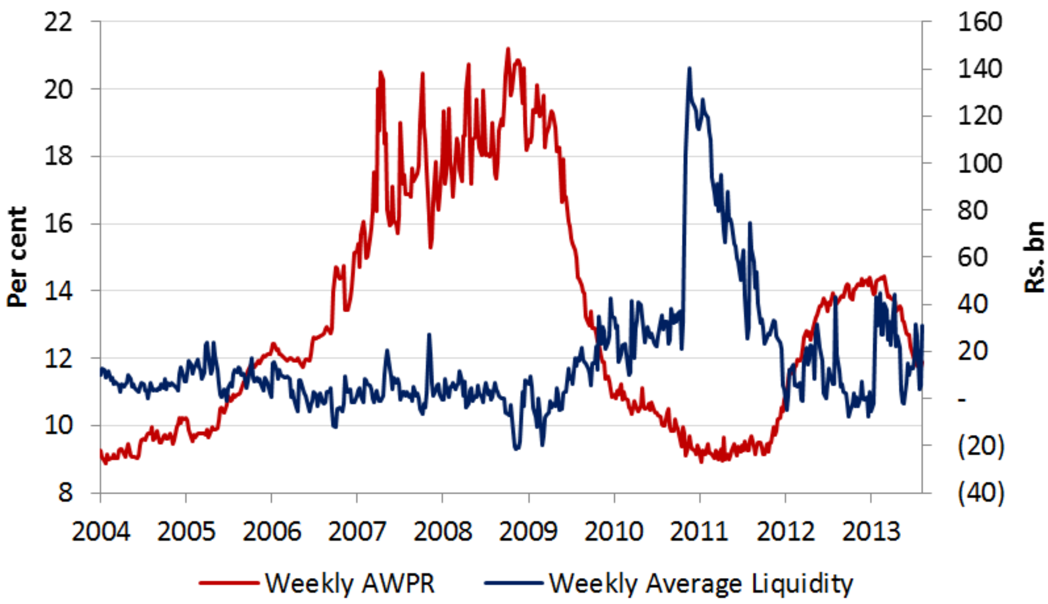


Figure-1. Weekly AWPR vs. Weekly Average Liquidity

Source: CBSL

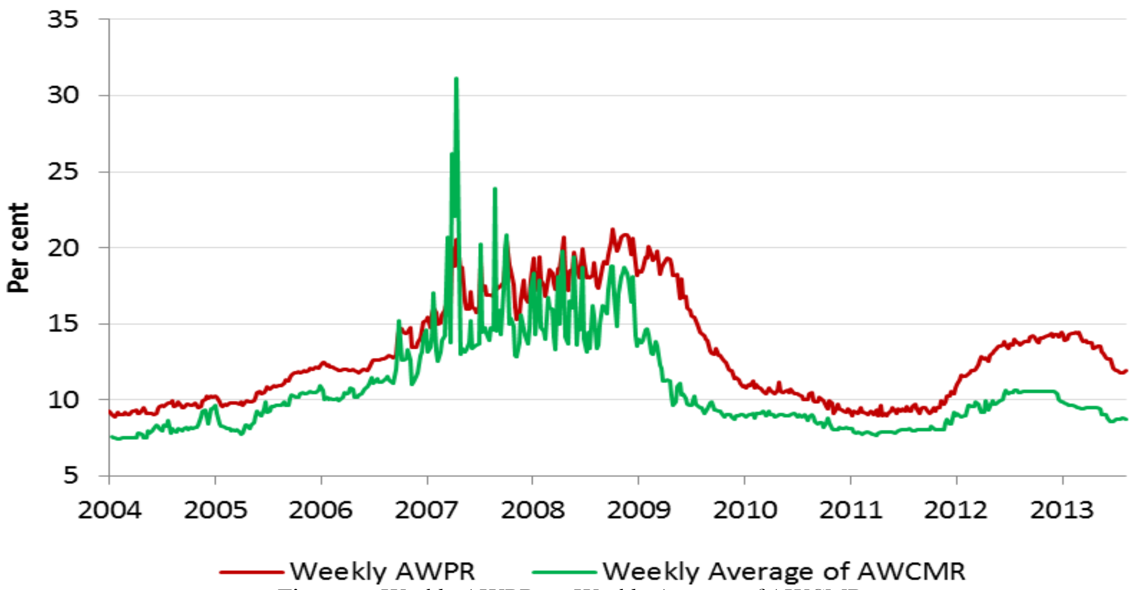


Figure-2. Weekly AWPR vs. Weekly Average of AWCMR

Source: CBSL

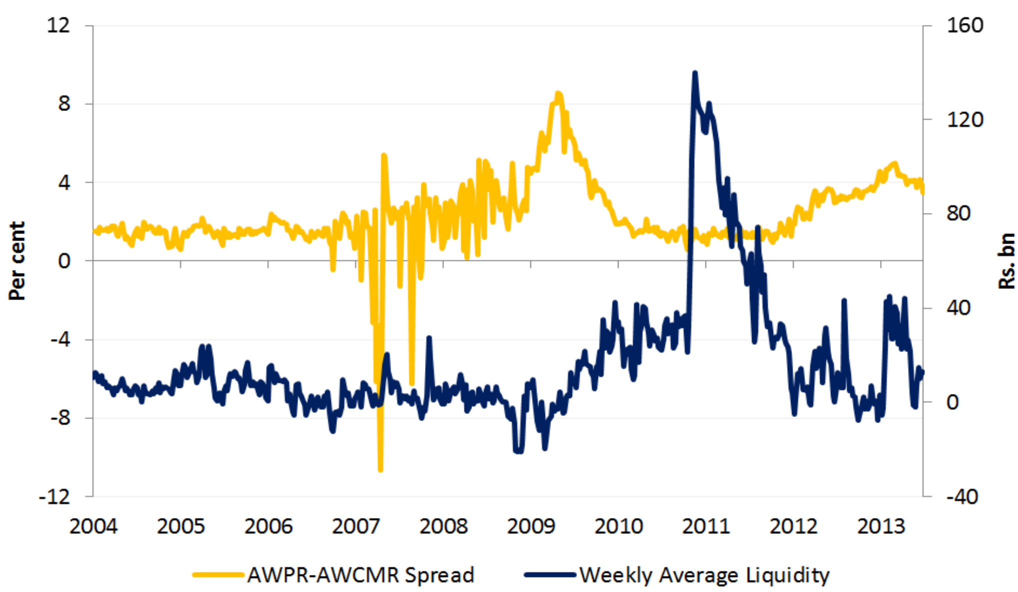


Figure-3. AWPR-AWCMR Spread vs. Weekly Average Liquidity

Source: Author's calculations, CBSL

This paper aims to analyse the behaviour of the prime lending rate in Sri Lanka. To start with, this study is attempts to identify the key determinants of the prime lending rate and their statistical significance. Moreover, corporates claim that prime lending rates of commercial banks respond slow to changes in monetary policy, especially during policy relaxation periods and insist that the prime lending rate of the current week, charged by commercial banks, is set based on the preceding week's AWPR published by CBSL. In order to verify the above, econometric tests are conducted to test for asymmetric adjustments during different monetary policy cycles in the economy. Further, the above experiments are extended to examine the existence of prime rate persistence, followed by an analysis of its implications on policy.

In doing so, this paper is organised as follows. Section 2 discusses literature on determinants of interest rates, particularly the prime lending rate, and asymmetries in prime rate changes and persistence. Section 3 details data and statistical/econometric tools used in this exercise, followed by Section 4, which presents the model, findings and analysis. The final section, Section 5, will present the conclusions of the study and policy implications.

2. Literature Review

Many researchers have observed that banks respond quickly to changes in the stance of monetary policy by way of increasing their loan rates much faster during tightening cycles than reducing when monetary policy is eased (Diebold and Sharpe, 1990; Cover, 1992). However, this is barely true when deposit rates are concerned, as banks react faster by lowering deposit rates during relaxing cycles compared to policy tightening cycles, where the deposit rates are sluggishly raised (Neumark and Sharpe, 1992; Hutchison, 1995).

The same irregularity has been noticed by many analysts when it comes to changes in the prime lending rate (Dueker and Thornton, 1994; Mester and Saunders, 1995). Such asymmetries slow the pass-through and neutralise the full effects of monetary policy. However, some analysts have found little or no evidence of such asymmetries (Goldberg, 1982; Laderman, 1990; Tkacz, 2001; Amarasekara, 2005).

The downward stickiness of lending rates in general and the prime rate in particular as highlighted by most researchers is likely to be due to the following;

- To maximise the bank's profitability by increasing the prime lending rates immediately or quickly after policy rates are raised.
- Delaying the reduction in the prime rates when policy rates are lowered in order to compensate for or recover the increased cost of funds accrued by mobilising deposits at high rates of interest.
- Banks would choose to delay lowering of rates or not lower rates at all if switching costs of customers are significantly high.
- Banks, in order to avoid problems of adverse selection, moral hazard and the increased credit risk of companies during cyclical downturns in the economy, end up charging a higher prime or delay reducing the prime, albeit the downward adjustment of policy rates by the monetary authority in order to revive economic activity.

It is also noteworthy that the significance of the prime rate has diminished in some countries as pointed out by Arak *et al.* (1983); Dueker and Thornton (1994) and Dueker (2000) due to the increased amount of loans that have been made below the prime rate.

Arak *et al.* (1983) explaining the behaviour of the prime rate in the US during 1972 - 1983, highlighted that there was minimal or no asymmetry in the prime rate in relation to the market lending rates during the early 1970s. However, the degree of asymmetry increased during the late 1970s and early 1980s on account of the development of substitutes to domestic bank lending such as the growth of the commercial paper market and increased access to sources of funds abroad, thereby providing banks the opportunity to charge varied rates from both interest-sensitive and non-interest-sensitive borrowers.

Laderman (1990) using vector autoregression (VAR) to study the responsiveness of the prime rate to open market interest rates in the US, found out that that the prime rate's responsiveness to Treasury bill rates, which was rather poor during 1964 – 1982, improved and became more closely linked in the subsequent period (1983 – 1990) due to increased competition from the commercial paper market and advancements in technology.

Mester and Saunders (1995) found out that adjustments to the prime rate will occur only when the returns from the difference of the optimal prime rate and the current prime rate exceeds the costs of changing the prime. Further, they observed that banks raise their prime rate dramatically when cost of funds increase, but delay reducing prime rates as cost of funds reduce so as to make short-term profits.

Dueker and Thornton (1994) using an ordered probit model to measure asymmetry in the prime rate, identified that banks respond strongly and speedily to increases but sluggishly to decreases in the Federal Reserve's discount rate with the rationale for such downward stickiness being to make an allowance for or charging a risk premia by reducing lending rates slowly during cyclical downturns.

In line with the above, Dueker (2000) again in his paper on asymmetries in the prime rate, pointed out that contractionary monetary policy have greater effect than relaxed monetary policy in the US, but accentuated that if not for asymmetry, banks would lend fewer funds as asymmetry is perhaps the reaction of the market to odds of borrowers defaulting or making late payments during economic downturns.

However, Tkacz (2001) using a simple threshold model considering weekly data from the early 1970s till the late 1990s concluded that prime rate changes respond symmetrically to changes in the Fed funds rate while the prime rate adjustment is more definite when the disparity among the prime and the Fed funds rate movements broaden and is more.

Thompson (2006) applying threshold autoregressive (TAR) and momentum threshold autoregressive (MTAR) models found asymmetries in the US prime lending-deposit rate spread during the period of October 1979 to March 2003, which supports the theory that banks adjust their lending rates at snail's pace as the spread widens.

Whilst agreeing with most other researchers on the asymmetric adjustment of the prime rate to changes in the Fed funds rate over the period from February 1987 to October 2005, Payne and Waters (2008) concluded that the prime rate was more upward rigid (i.e., the prime rate adjusted slower to a decrease in the Fed funds rate) as opposed to being downward rigid as claimed by Mester and Saunders (1995); Dueker and Thornton (1994); Dueker (2000) and Thompson (2006).

Findings on the above in the Sri Lankan context would be appropriate to look into. However, there is very limited literature on the above area under discussion. Amarasekara (2005) examined the interest rate pass-through from policy interest rates to call money rates and from that to retail interest rates of commercial banks over the period of June 1990 – December 2004, and found out that there is a fuller pass-through from policy rates to the call money market rate, while a complete and faster pass-through from call money rates to the prime lending rate could also be observed, unlike to other retail bank interest rates, showing no indication of an asymmetry in the pass-through.

As stated above, prior empirical studies on the prime lending rate in Sri Lanka and asymmetries in adjustment of prime lending rates to changes in the monetary policy stance are very limited. Further, there was no published literature found on the subject of persistence of the prime rate in Sri Lanka. Hence, this study, which attempts to discuss all of the abovementioned issues, is likely to set the platform along with few other research studies on the area of interest rates in Sri Lanka with a greater emphasis on the prime lending rate, its determinants, asymmetries, persistence and implications on policy. Data and statistical/ econometric tools that would be used for this exercise to fulfill the achievements of this study would be discussed in the next section.

3. Data and Statistical/Econometric Tools Used

3.1. Description of Data

As specified before, the purpose of this study is to analyse the behaviour of prime lending rates in Sri Lanka, while emphasizing on its determinants, asymmetric behaviour in prime rate movements, persistence and its policy implications. Following extensive analysis of prime lending rates in Sri Lanka, it has been noted that changes to the prime rate are likely to be caused by changes in the short-term money market interest rates triggered by changes in the monetary policy stance, i.e., changes in the policy interest rates as decided by the Monetary Board of the Central Bank. It has also been identified that changes in the levels of domestic money market liquidity also contribute to changes in short-term money market rates, which could, in effect, affect the prime lending rate.

Hence, for the purpose of this study, we use weekly AWPR, and weekly averages of the average weighted call money rate (AWCMR) and liquidity in the domestic money market from the period ranging from 01 January 2004 to 27 June 2013, which includes 496 observations. Definitions of the AWCMR and domestic money market liquidity are given below.

a) Average weighted call money rate (AWCMR) – This is the weighted average of the rates at which banks transact with other banks in the interbank call money market.

b) Domestic money market liquidity – This refers to the excess or shortfall of funds in the domestic money market. This is measured as reserves held by commercial banks with the Central Bank in excess of the required reserve.

Data on AWCMR and domestic money market liquidity are available on a daily basis. However, for the purpose of this study, weekly averages of both AWCMR and domestic money market liquidity are used as data on AWPR is available only on a weekly basis. These 3 variables are denoted as follows:

i. WKAWPR – Weekly Average Weighted Prime Lending Rate (in per cent)
ii. WKAVGAWCMR – Weekly Average of Average Weighted Call Money Rate (in per cent)
iii. WKAVGLIQ – Weekly Average Liquidity in the Domestic Money Market (in billion Sri Lanka Rupees)

To further aid our analysis, it was to be decided whether obtaining the first differences and/or the detrended series of the above variables would be vital to effectively support the range of econometric tests that was to be performed as part of this exercise. Normally, interest rates are stationary but in the case of Sri Lanka, due to episodes of high inflation, interest rates tend to be non-stationary. Detrending interest rates using the Hodrick-Prescott Filter (HP Filter) allows the analysis to be done based on a gap approach where the trend component and the cyclical component are separated, facilitating a more effective analysis. Therefore, it was decided to detrend WKAWPR and WKAVGAWCMR using the HP Filter, whereby cyclical and trend series of the above variables were obtained using a smoothing parameter of Lambda (λ) 270,400, as those were weekly data. The cyclical or detrended series of WKAWPR and WKAVGAWCMR is denoted as HPCYCLEAWPR and HPCYCLEAWCMR, respectively. Also, a dummy variable was created to reflect the monetary policy stance adopted by the CBSL. DUMMYUP is the dummy variable defined as 1 to indicate periods of monetary policy tightening or increase in policy interest rates.

3.2. Description of Statistical/ Econometric Tools Used

In order to identify the determinants of prime lending rates, asymmetries in prime rate changes and persistence, the following statistical methods and econometric tests were used:

a) Descriptive statistics, namely, mean, median, standard deviation, maximum and minimum of time series data to identify the properties of the dataset.

b) Augmented Dickey-Fuller (ADF) test, a unit root test, was used to test for stationarity of the data prior to using these for econometric analysis so as to avoid any spurious or nonsensical regressions.

c) Correlation tests were carried out to identify any statistical relationships among the above variables

d) Granger causality tests introduced by Clive Granger were used to test causality between AWPR, AWCMR and liquidity to identify whether changes in AWCMR and liquidity causes changes in AWPR or vice versa.

e) Ordinary least square regressions were used to identify whether call money rates and domestic money market liquidity are key determinants of the prime lending rate in Sri Lanka. Further, it also aids in testing persistence, which is a key objective of this study.

f) A vector autoregression (VAR) model was drawn to test how a one-time shock to the independent variables, i.e., the call money market rate, domestic money market liquidity, and the lagged prime lending rate, could bring about a change in AWPR in the current period.

4. Analysis and Findings

4.1. Descriptive Statistics

Prior to performing other complex econometric analyses, it will be useful to look into the descriptive statistics to better understand and explain the properties of the data variables that are used in this study. Table 1 exhibits the descriptive statistics, including mean, median, maximum, minimum and standard deviation of these series.

Table-1. Descriptive Statistics

	WKAWPR	WKAVGAWCMR	WKAVGLIQ
Sample period	01/01/2004 - 06/27/2013		
Observations	496	495	496
Mean	13.0933	10.7941	16.3874
Median	12.1850	9.6540	7.3516
Maximum	21.1900	31.1650	140.0539
Minimum	8.8900	7.4343	-21.1787
Std. Dev.	3.4509	3.2788	26.5432

Source: Author's calculations based on CBSL data

Descriptive statistics indicate that WKAWPR, on average, has been 230 basis points higher than WKAVGAWCMR, although the maximum WKAVGAWCMR remained higher at 31.165 per cent in April 2007 particularly due to the increased demand for funds during the festive week and that too in a short week, while the surge in call rates were predominantly due to uncertainties in the financial market of Sri Lanka following the triggering of the global economic downturn in 2007. The maximum WKAWPR was recorded at 21.19 per cent in late 2008. However, considering the mean and minimum interest rates, it appears that the spread between WKAWPR and WKAVGAWCMR is larger when the mean rates are concerned, as opposed to the minimum rates presenting higher spreads when market interest rates are high in contrast to an era with low interest rates. The standard deviation of WKAWPR is marginally higher than WKAVGAWCMR and denotes relatively low volatility in AWCMR possibly due to the weekly averaging of AWCMR, which is computed on a daily basis. WKAVGLIQ has been in excess, on average, during this period and peaked to around Rs. 140 billion with the receipt of international sovereign bond proceeds in late 2010.

4.2. Testing for Stationarity

To verify the stationarity of the time series, the variables were subjected to the Augmented Dickey-Fuller (ADF) unit root test (Dickey and Fuller, 1979) to avoid any spurious regressions. The tests were performed using a maximum lag length of 4, from which the appropriate lag length was chosen automatically based on the Schwarz Information Criteria (SIC). As shown in Table 2, the detrended variables (i.e. HPCYCLEAWPR and HPCYCLEAWCMR) were stationary on levels at 1 per cent significance level. WKAVGLIQ was stationary on levels at 1 per cent level when the test equation included the constant, but when both the constant and the trend components were included in the test equation, WKAVGLIQ was stationary only at the 10 per cent level. However, WKAWPR and WKAVGAWCMR were not stationary on levels in both instances where the test equation included the constant in one and both the constant and the trend components in the other. Subsequently, unit root tests were performed on first differences for WKAWPR and WKAVGAWCMR, resulting in those variables being stationary at a very high level of significance. Since the series of HPCYCLEAWPR, HPCYCLEAWCMR and WKAVGLIQ was I(0) and the series of WKAWPR and WKAVGAWCMR were I(1), it was concluded that testing for co-integration between these variables was not necessary. The series of HPCYCLEAWPR would be used as the series representing AWPR, HPCYCLEAWCMR would be used as the series representing AWCMR and WKAVGLIQ would be used as the series representing domestic money market liquidity. The detrended series of AWPR and AWCMR was used for this analysis as I(1) data (i.e., data that is stationary at first differences) leads to excessive volatility while also concealing the dynamics, nature and behaviour of the data, whereas such dynamics are preserved to a greater extent, relatively, in the detrended series of data (see Figure 4 – 5) reason why it may be more appropriate for this exercise.

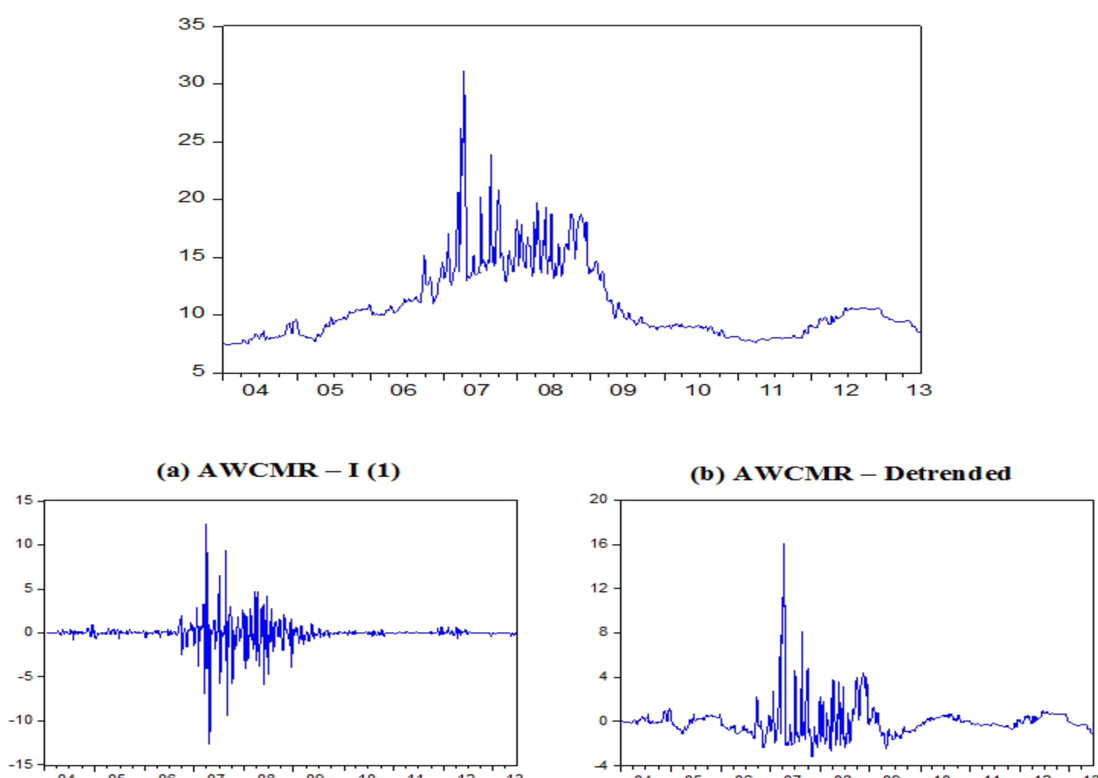


Figure-4. Average Weighted Call Money Rate (AWCMR)

Source: CBSL

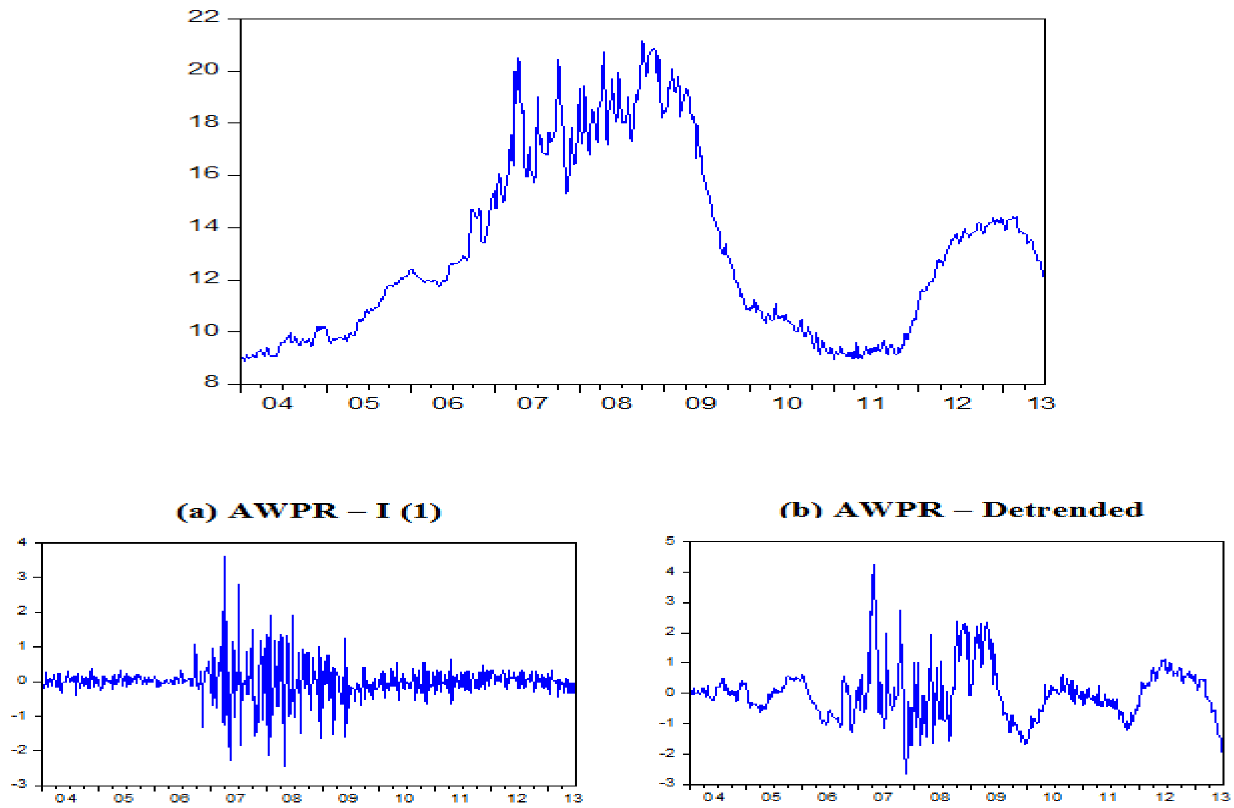


Figure-5. Average Weighted Prime Lending Rate (AWPR)

Source: CBSL

Table-2. ADF Unit Root Test Results

Series	Level			First Difference		
	Lags	Included		Lags	Included	
		Constant	Constant & Trend		Constant	Constant & Trend
WKAWPR	1	-1.6826	-1.6276	0	-26.527*	-26.5341*
		(0.4395)	(0.7809)		(0.0000)	(0.0000)
WKAVGAWCMR	4	-2.4239	-2.5241	3	-17.3682*	-17.3708*
		(0.1357)	(0.3163)		(0.0000)	(0.0000)
WKAVGLIQ	0	-3.1984*	-3.4112***	0	-23.3774*	-23.3539*
		(0.0207)	(0.0510)		(0.0000)	(0.0000)
HPCYCLEAWPR	1	-5.7453*	-5.7359*	3	-14.6709*	-14.6645*
		(0.0000)	(0.0000)		(0.0000)	(0.0000)
HPCYCLEAWCMR	1	-9.1632*	-9.1537*	3	-17.5429*	-17.5254*
		(0.0000)	(0.0000)		(0.0000)	(0.0000)
Note: MacKinnon (1996) one-sided p-values are in parentheses below the t-Statistic values						
Test Critical Values:		**Constant**	**Constant &Trend**			
1% level (*)		-3.4434	-3.9767			
5% level (**)		-2.8672	-3.4189			
10% level (***)		-2.5698	-3.1320			

Source: Author's calculations based on CBSL data

4.3. Testing for Correlation

HPCYCLEAWPR, HPCYCLEAWCMR and WKAVGLIQ were used to test for cross-correlations.

Table-3. Correlation Matrix

Stationary Variables	HPCYCLEAWPR	HPCYCLEAWCMR	WKAVGLIQ
HPCYCLEAWPR	1.0000		
HPCYCLEAWCMR	0.6431	1.0000	
WKAVGLIQ	-0.2011	-0.1219	1.0000

Source: Author's calculations based on CBSL data

As per findings following the test for cross-correlations as shown in Table 3, it was observed that the call money rate (HPCYCLEAWCMR) has a high degree of positive correlation with the prime lending rate (HPCYCLEAWPR). However, liquidity in the domestic money market (WKAVGLIQ) seems to have a relatively weak correlation with the prime lending rate as well as the call money market rate, although the nature of correlation is negative as it should be in theory.

Although statistically it appears that liquidity in the domestic money market has a weak correlation with the prime lending rate, it is theoretically and practically a fact that domestic money market liquidity is also an important determinant of market interest rates. The Hodrick-Prescott Filter (HP Filter) was used to obtain cyclical and trend series of domestic money market liquidity and scatter plots were drawn using the cyclical series of data on domestic money market liquidity and the prime lending rate (i.e. HPCYCLEAWPR) to identify their relationships during monetary policy easing cycles as well as tightening cycles.

Figure 6 confirms that during policy easing cycles, the relationship between money market liquidity and the prime lending rate is overtly weak, although negatively correlated. However, during policy tightening cycles, as shown in Figure 7, the relationship between these variables are relatively stronger indicating that money market liquidity is a rather important determinant of the prime lending rate, among other factors, during periods of contractionary monetary policy compared to its effect on the prime during loose monetary policy episodes.

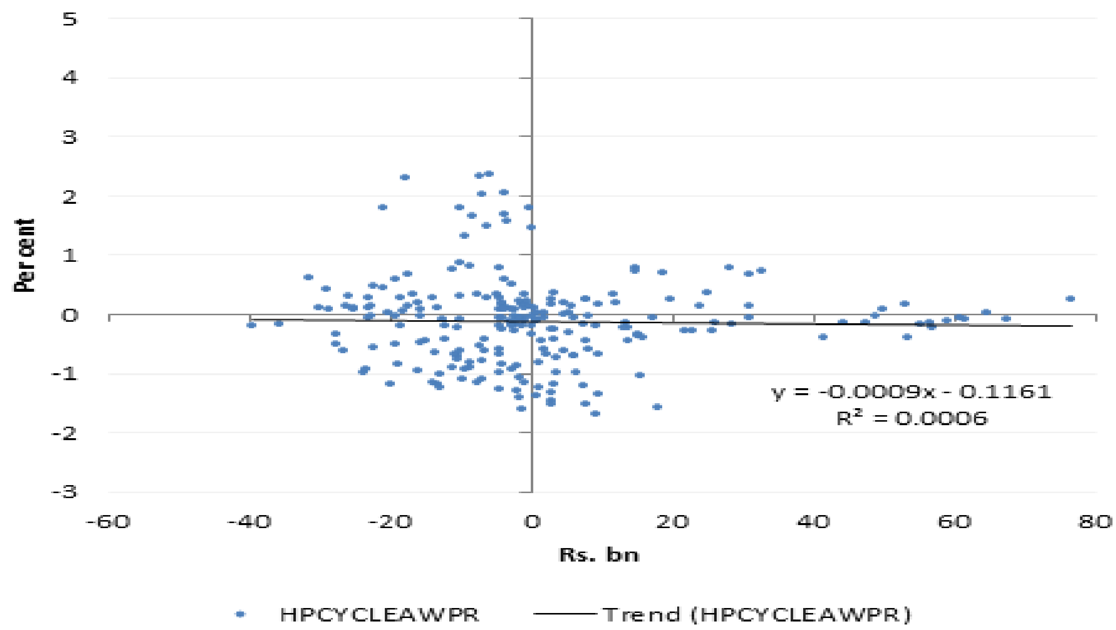


Figure-6. Relationship between Liquidity and AWPR (in policy tightening cycles)
Source: Author's calculations based on CBSL data

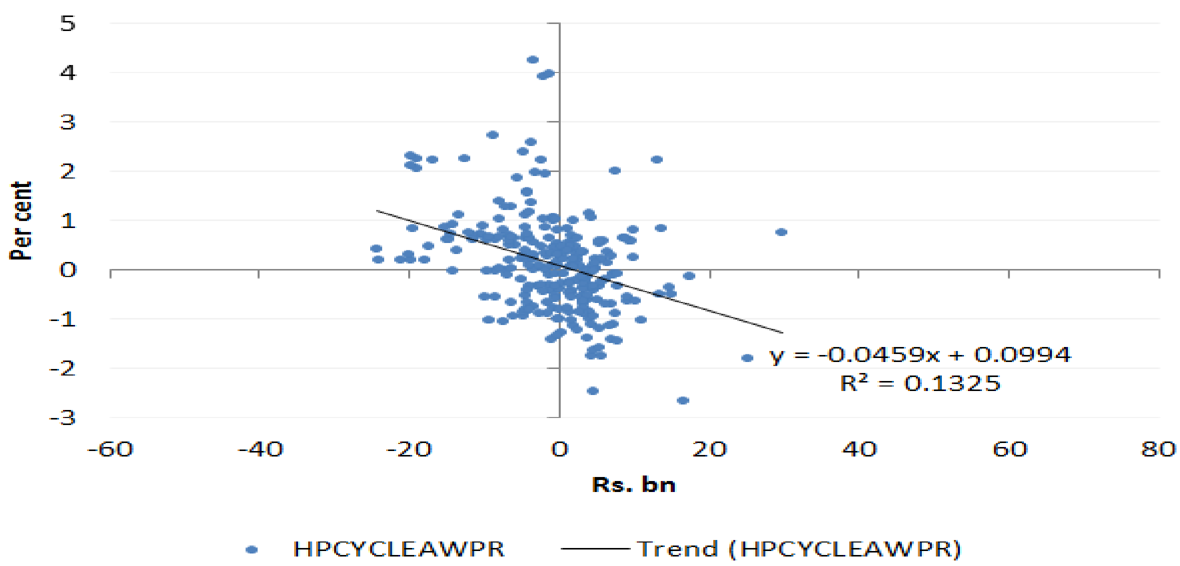


Figure-7. Relationship between Liquidity and AWPR (in policy tightening cycles)
Source: Author's calculations based on CBSL data

4.4. Granger Causality Test Results

Next, we test for causality to verify the existence of unidirectional or bidirectional causality among the aforementioned variables (i.e., between prime lending rate and the call money market rate, and between prime lending rate and domestic money market liquidity). For this, we have performed Granger causality tests (Granger, 1981) on 3 data samples. First, we have checked for causality by taking the entire sample of data from the period 01/01/2004 to 06/27/2013, which is shown in Table 4. Secondly, we have determined periods of upward and downward trends in the call money rates, and thereafter checked for causality among these variables (Table 5). Finally, upward and downward trends of domestic money market liquidity have been identified and these variables were then again tested for causality, which is shown in Table 6. The HP Filter was used to draw trend graphs in order to identify upward and downward periods of call money market rates and domestic money market liquidity, which were subsequently used for the second and third attempts to test for causality. The results are also presented for five chosen lag lengths, which are in weeks; 1, 2, 4, 12 and 26 lags.

Test results of Table 4 indicates that changes to call money market rates leads to changes in the prime lending rate in lag lengths 2 through 26. It also indicates that the prime lending rate causes changes in the call money market rates at lag lengths 12 and 26, indicating bidirectional causality. Further, increasing bidirectional causality could be observed when the lag lengths increase, indicating signs of cointegration between the two variables. However, causality between domestic money market liquidity and the prime lending rate is relatively weaker as indicated by Table 4.

As per the causality test findings in Table 5 and Table 6, when different periods of upward and downward trends of both call money market rates and domestic money market liquidity are considered, the position on causality cannot be commented on and therefore is inconclusive. Data in Table 5 suggests that changes in call money rates causes changes in prime lending rates in lag lengths 4 and 12, except in the second upward period (02/17/2011-10/18/2012) of call money market rates. The same causality is evident in the first upward and downward period in lag length 2, and in the two upward cycles in lag length 1. It also shows that changes in domestic money market liquidity causes changes in prime lending rates in both upward periods in lag length 1, 4 and 26 but no evidence of causality could be seen in the downward periods. In addition, data in Table 6 shows mixed results. However, changes in call money market rates (HPCYCLEAWCMR) and domestic money market liquidity (WKAVGLIQ) causes changes in prime lending rates (HPCYCLEAWPR) when the entire sample is considered at a lag length of 2. Bidirectional causality exists between the two variables HPCYCLEAWPR and HPCYCLEAWCMR when the lag length is 12 and 26, while the null hypothesis of WKAVGLIQ does not cause HPCYCLEAWPR, is rejected at the lag length of 2, implying that domestic money market liquidity causes changes in prime lending rates. On the whole, following those results from the causality tests, it can be deduced that both the call money market rate as well as domestic money market liquidity are key determinants of the prime lending rate in Sri Lanka.

Table-4. Granger Causality Test: Entire Sample (01/01/2004 - 06/27/2013)

Null Hypothesis	P value of F-statistic				
	1 Lag	2 Lags	4 Lags	12 Lags	26 Lags
HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.8505	0.3204	0.2904	0.0533	0.0071
HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.3737	0.0565	0.0001	1.E-05	4.E-07
WKAVGLIQ does not cause HPCYCLEAWPR	0.1240	0.0390	0.1800	0.6957	0.8926
HPCYCLEAWPR does not cause WKAVGLIQ	0.0478	0.1248	0.3771	0.9096	0.9586

Source: Author's calculations based on CBSL data

Table-5. Granger Causality Test: Changes in AWCMR

Sample	Null Hypothesis	P value of F-statistic				
		1 Lag	2 Lags	4 Lags	12 Lags	26 Lags
Upward period: 01/01/2004-12/27/2007	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.4378	0.9422	0.2760	0.0348	0.0381
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.0771	0.0005	0.0082	0.0004	0.0005
	WKAVGLIQ does not cause HPCYCLEAWPR	0.0743	0.0019	0.0013	0.0033	0.0015
	HPCYCLEAWPR does not cause WKAVGLIQ	0.0001	0.0015	2.E-05	0.0001	0.0013
Downward period: 01/03/2008-02/10/2011	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.1581	0.0428	0.0682	0.2457	0.0558
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.6591	2.E-05	0.0006	0.0199	3.E-06
	WKAVGLIQ does not cause HPCYCLEAWPR	0.3654	0.3098	0.6869	0.9827	0.9914
	HPCYCLEAWPR does not cause WKAVGLIQ	0.2002	0.1727	0.2899	0.7669	0.8936
Upward period: 02/17/2011-10/18/2012	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.0022	0.0073	0.0250	0.0814	0.7070
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.0253	0.1636	0.5513	0.4656	0.8730
	WKAVGLIQ does not cause HPCYCLEAWPR	0.0674	0.1638	0.0866	0.3450	0.0495
	HPCYCLEAWPR does not cause WKAVGLIQ	0.3432	0.1675	0.3674	0.6656	0.0800
Downward period: 10/25/2012-06/27/2013	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.3245	0.5533	0.7515	0.8764	NA
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.2172	0.2060	0.0488	0.0809	NA
	WKAVGLIQ does not cause HPCYCLEAWPR	0.8297	0.6338	0.2922	0.1602	NA
	HPCYCLEAWPR does not cause WKAVGLIQ	0.7750	0.1549	0.2717	0.3692	NA

Source: Author's calculations based on CBSL data

4.5. Ordinary Least Square (OLS) Estimate of the Model and Findings

To analyse the significance and influence of the call money market rate, domestic money market liquidity and lagged AWPR in the determination of the current week's AWPR, a series of ordinary least squares estimates were performed.[2] Up to 8 lags of all the above variables were tested but as per the regression results, only lags 1 and 4 of the prime rate proved to be statistically significant in determining the current week's AWPR. The model proved to be less robust as the number of lags of HPCYCLEAWPR was increased further. Likewise, HPCYCLEAWCMR and its first and fourth lags turned out to be statistically significant, although lags 2 and 3 proved otherwise, just as in the case of HPCYCLEAWPR. Also, lags of WKAVGLIQ turned out to be statistically insignificant. Further, to capture the effects of the prevailing monetary policy stance in the determination of the current week's AWPR, the dummy variable of DUMMYUP, which reflects the period of tight monetary policy in the economy or increase in policy interest rates by assuming a value of 1, was used, which was then interacted with HPCYCLEAWCMR.

Hence, the multiple regression model for the determination of AWPR is as follows:

$$HPCYCLEAWPR_t = \alpha_0 + \sum_{i=0}^{4} \alpha_1 HPCYCLEAWCMR_{t-i} + \sum_{i=1}^{4} \alpha_2 HPCYCLEAWPR_{t-i} + \alpha_3 WKAVGLIQ_t + \alpha_4 (DUMMYUP*HPCYCLEAWCMR_t) + \varepsilon_t \quad (2)$$

Ordinary least square (OLS) estimates of the above model (using robust standard errors) are shown in Table 7.

[2] Alternate multiple regression models and their OLS estimates are shown in Appendix 1

Results of the above regression showed that the average weighted call money rate in the current week (i.e., $HPCYCLEAWCMR_t$) along with that of the preceding week, is an important determinant of the current week's average weighted prime lending rate ($HPCYCLEAWPR_t$). Its combined effect on the current week's AWPR was about 20 per cent. However, domestic money market liquidity, thought to be a key determinant of interest rates, proved to be statistically insignificant as per the above model, with its impact on the prime lending rate was extremely weak at about 0.06 per cent, although the relationship is negative, as reflected in the estimated coefficient. The most remarkable finding was the existence of prime rate persistence, which is measured by the lagged prime rate coefficient.

Table-6. Granger Causality Test: Changes in Liquidity

Sample	Null Hypothesis	P value of F-statistic				
		1 Lag	2 Lags	4 Lags	12 Lags	26 Lags
Upward period: 01/01/2004-03/24/2005	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.9530	0.2932	0.7703	0.9859	NA
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.0044	0.0214	0.0092	0.2520	NA
	WKAVGLIQ does not cause HPCYCLEAWPR	0.0017	0.0141	0.0365	0.0257	NA
	HPCYCLEAWPR does not cause WKAVGLIQ	0.4801	0.4376	0.9879	0.9754	NA
Downward period: 03/31/2005-11/23/2006	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.7434	0.9426	0.3139	0.2019	0.0965
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	4.E-07	2.E-07	1.E-06	2.E-05	0.0010
	WKAVGLIQ does not cause HPCYCLEAWPR	0.5419	0.0301	0.0912	0.6471	0.6307
	HPCYCLEAWPR does not cause WKAVGLIQ	0.0026	0.0031	0.0280	0.3069	0.0380
Upward period: 11/30/2006-05/31/2007	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.9289	0.7750	0.1895	0.1417	NA
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.4304	0.1221	0.4168	0.4283	NA
	WKAVGLIQ does not cause HPCYCLEAWPR	0.1425	0.0380	0.2522	0.5128	NA
	HPCYCLEAWPR does not cause WKAVGLIQ	0.0163	0.0849	0.0167	0.5952	NA
Downward period: 06/07/2007-10/02/2008	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.6474	0.3973	0.8978	0.2976	0.4019
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.0384	0.2846	0.5292	0.2385	0.2840
	WKAVGLIQ does not cause HPCYCLEAWPR	0.0006	0.0055	0.0387	0.1012	0.4775
	HPCYCLEAWPR does not cause WKAVGLIQ	0.1116	0.3142	0.2437	0.2241	0.4350
Upward period: 10/09/2008-01/27/2011	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.1804	0.0601	0.2115	0.1676	0.0008
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.7250	0.0166	0.0656	0.0531	0.0013
	WKAVGLIQ does not cause HPCYCLEAWPR	0.6306	0.5501	0.8408	0.7978	0.7102
	HPCYCLEAWPR does not cause WKAVGLIQ	0.6654	0.7595	0.8545	0.8434	0.8027
Downward period: 02/03/2011-11/22/2012	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.0026	0.0081	0.0292	0.0990	0.6027
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.0146	0.1368	0.5180	0.4883	0.8332
	WKAVGLIQ does not cause HPCYCLEAWPR	0.0820	0.2533	0.1934	0.5073	0.1732
	HPCYCLEAWPR does not cause WKAVGLIQ	0.3836	0.1586	0.3059	0.6698	0.2789
Upward period: 11/29/2012-06/27/2013	HPCYCLEAWPR does not cause HPCYCLEAWCMR	0.1369	0.2922	0.4373	0.6860	NA
	HPCYCLEAWCMR does not cause HPCYCLEAWPR	0.4121	0.3594	0.0963	0.1301	NA
	WKAVGLIQ does not cause HPCYCLEAWPR	0.8920	0.6923	0.3618	0.3465	NA
	HPCYCLEAWPR does not cause WKAVGLIQ	0.9723	0.2848	0.4326	0.6714	NA

Source: Author's calculations based on CBSL data

Prime rate persistence could be observed with the preceding week's AWPR accounting for 63.5 per cent of the current week's AWPR; statistically significant at the 1 per cent level. This phenomenon, as highlighted by market participants, especially by those prime borrowers, implies the presence of prime rate persistence, where commercial banks consider the preceding week's prime lending rate as a benchmark when setting prime lending rate for the current week. Also, such a high degree of persistence, along with other factors, could result in rigidity of the prime lending rate, especially downwards, thereby leading to asymmetric adjustments following changes in monetary policy.

R-squared and the adjusted R-squared recorded around 0.85, while the probability value of the F-statistic indicates that all variables in the regression jointly can influence the dependent variable, which is the prime lending rate. The above model was estimated using robust standard errors (Heteroscedasticity Consistent Covariances) by White (1980) to obtain consistent estimates of coefficient covariances as the residuals appeared to be heteroscedastic. Further, the Breusch-Godfrey serial correlation LM test (Godfrey, 1978); (Breusch, 1978) was conducted to test for serial correlation, which resulted in the null hypothesis of no serial correlation in residuals not being rejected. This result was confirmed by the Durbin-Watson statistic reported above, which is 2.03 per cent (Durbin and Watson, 1951).

Table-7. OLS Estimates of HPCYCLEAWPR (using Robust Standard Errors)

Independent Variables	**Coefficient**	**P-value**
Constant	0.0046	0.8035
	(0.0183)	
$HPCYCLEAWCMR_t$	0.2721	0.0000
	(0.0527)	
$HPCYCLEAWCMR_{t-1}$	-0.0739	0.0435
	(0.0366)	
$HPCYCLEAWCMR_{t-2}$	-0.0208	0.5483
	(0.0346)	
$HPCYCLEAWCMR_{t-3}$	0.0125	0.7277
	(0.0358)	
$HPCYCLEAWCMR_{t-4}$	-0.0841	0.0017
	(0.0266)	
$HPCYCLEAWPR_{t-1}$	0.6355	0.0000
	(0.0803)	
$HPCYCLEAWPR_{t-2}$	0.0720	0.3806
	(0.0821)	
$HPCYCLEAWPR_{t-3}$	-0.0117	0.8716
	(0.0727)	
$HPCYCLEAWPR_{t-4}$	0.1882	0.0007
	(0.0550)	
$WKAVGLIQ_t$	-0.0006	0.1981
	(0.0005)	
$(DUMMYUP*HPCYCLEAWCMR)_t$	0.0020	0.9682
	(0.0505)	
No. of Observations (after adjustments)	491	
R-squared	0.8568	
Adjusted R-squared	0.8535	
Log likelihood	-164.1038	
Durbin-Watson Statistic	2.0341	
F-Statistic	260.5427	0.0000

Note: Standard errors are in parentheses below the estimated coefficients.
Source: Author's calculations based on CBSL data

4.6. Vector Autoregression (VAR) Model Findings

Next, in order to identify how the present level of each variable in the model depends on past movements in that particular variable as well as in all other variables of the model and to test how a one-time shock to the independent variables in this study could bring about a change in the prime lending rate (i.e. AWPR), an unrestricted vector autoregressive (VAR) model is formed and expressed in the following form:

$$HPCYCLEAWCMR_t = \alpha_0 + \alpha_1 HPCYCLEAWCMR_{t-p} + \alpha_2 WKAVGLIQ_{t-p} + \alpha_3 HPCYCLEAWPR_{t-p} + \alpha_4 DUMMYUP_{1t} + \varepsilon_{1t} \quad (3)$$

$$HPCYCLEAWPR_t = \beta_0 + \beta_1 HPCYCLEAWCMR_{t-p} + \beta_2 WKAVGLIQ_{t-p} + \beta_3 HPCYCLEAWPR_{t-p} + \beta_4 DUMMYUP_{2t} + \varepsilon_{2t} \quad (4)$$

$$WKAVGLIQ_t = \gamma_0 + \gamma_1 HPCYCLEAWCMR_{t-p} + \gamma_2 WKAVGLIQ_{t-p} + \gamma_3 HPCYCLEAWPR_{t-p} + \gamma_4 DUMMYUP_{3t} + \varepsilon_{3t} \quad (5)$$

where,
p = number of lags included in the model
ε_t = vector of residuals

Prior to estimating the above VAR model, it is important to test the appropriate lag length. For this purpose, a test to determine the lag length criteria was performed. As suggested by VAR lag order selection criteria, the VAR model was then estimated using six lags (see Table 8). The six lag structure was suggested as the optimal for the model by the 'Sequential modified LR test statistic' (each test at 5 per cent level), Final prediction error (FPE) and Akaike information criterion (AIC). The Schwarz information criterion (SC) and the Hannan-Quinn information criterion (HQ), however, suggested that the optimal lag structure would be one and two, respectively.

Table-8. VAR Lag Length Criteria

VAR Lag Order Selection Criteria
Endogenous variables: HPCYCLEAWCMR HPCYCLEAWPR WKAVGLIQ
Exogenous variables: C DUMMYUP

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3657.947	NA	646.6709	14.98547	15.03691	15.00567
1	-2699.731	1896.838	13.32395	11.10319	11.23179*	11.15370
2	-2681.282	36.29339	12.81897	11.06455	11.27031	11.14536*
3	-2674.972	12.33559	12.96098	11.07555	11.35847	11.18667
4	-2656.298	36.27916	12.45846	11.03598	11.39606	11.17741
5	-2647.083	17.78964	12.44796	11.03510	11.47234	11.20684
6	-2637.341	18.68688*	12.41090*	11.03207*	11.54647	11.23411

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

VAR Lag Exclusion Wald Tests were performed to test for the joint significance of all endogenous variables and it was observed that the p-value for lag 3 was insignificant (Table 9). Considering the above, the VAR model was re-estimated with lags of one to two and four to six. (see Appendix 2)

Table-9. VAR Lag Exclusion Wald Tests

VAR Lag Exclusion Wald Tests

Chi-squared test statistics for lag exclusion:				
Numbers in [ ] are p-values				
	WKAVGLIQ	**HPCYCLEAWPR**	**HPCYCLEAWCMR**	**Joint**
Lag 1	390.1815	251.5190	104.5307	760.6224
	[0.000000]	[0.000000]	[0.000000]	[0.000000]
Lag 2	0.395948	11.47597	17.14491	23.37176
	[0.941078]	[0.009412]	[0.000660]	[0.005413]
Lag 3	0.201685	1.980146	9.352212	11.60456
	[0.977317]	[0.576538]	[0.024957]	[0.236531]
Lag 4	6.267360	5.865745	2.178221	29.41485
	[0.099303]	[0.118328]	[0.536251]	[0.000551]
Lag 5	2.611404	7.555177	12.46814	25.57248
	[0.455494]	[0.056158]	[0.005940]	[0.002399]
Lag 6	1.795580	16.08006	10.61492	18.97502
	[0.615897]	[0.001092]	[0.014001]	[0.025406]
df	3	3	3	9

Source: Author's calculations based on CBSL data

Next, it is imperative to ensure the stationarity of the series. For this purpose, the inverse roots of the autoregressive characteristic polynomial was examined and as per Figure 8, the VAR model is stationary (stable) since all roots lie inside the unit circle.

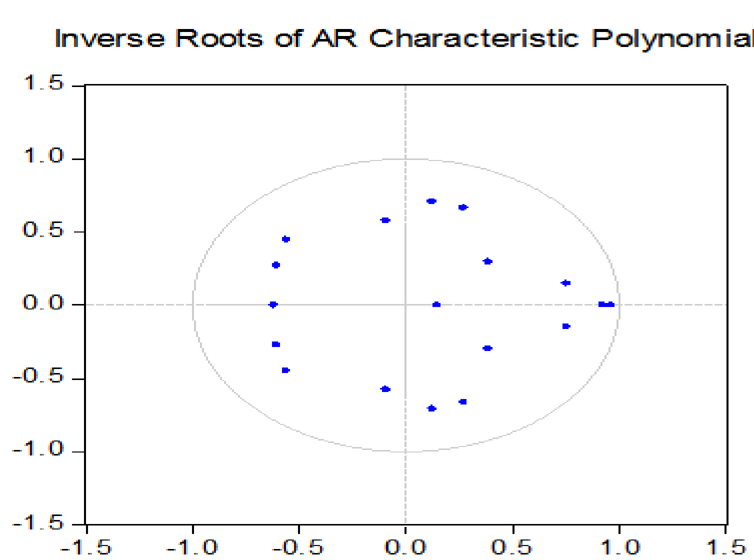


Figure-8. Stationarity of the VAR Model

The impulse response of the prime lending rate to unanticipated increases in call money market rates (AWCMR) and domestic money market liquidity, based on VAR estimates, were obtained for a period of 26 weeks and these responses included 'analytic (asymptotic) standard errors'. The impulse responses of AWPR to shocks on AWCMR, domestic money market liquidity and AWPR is shown in Figure 9.

As per the first graph in Figure 9 it is visible that a positive shock to the call money market rate has a positive impact on AWPR after the first lag, peaks at lag four, shows a slight negative effect and subsequently stabilises thereafter.

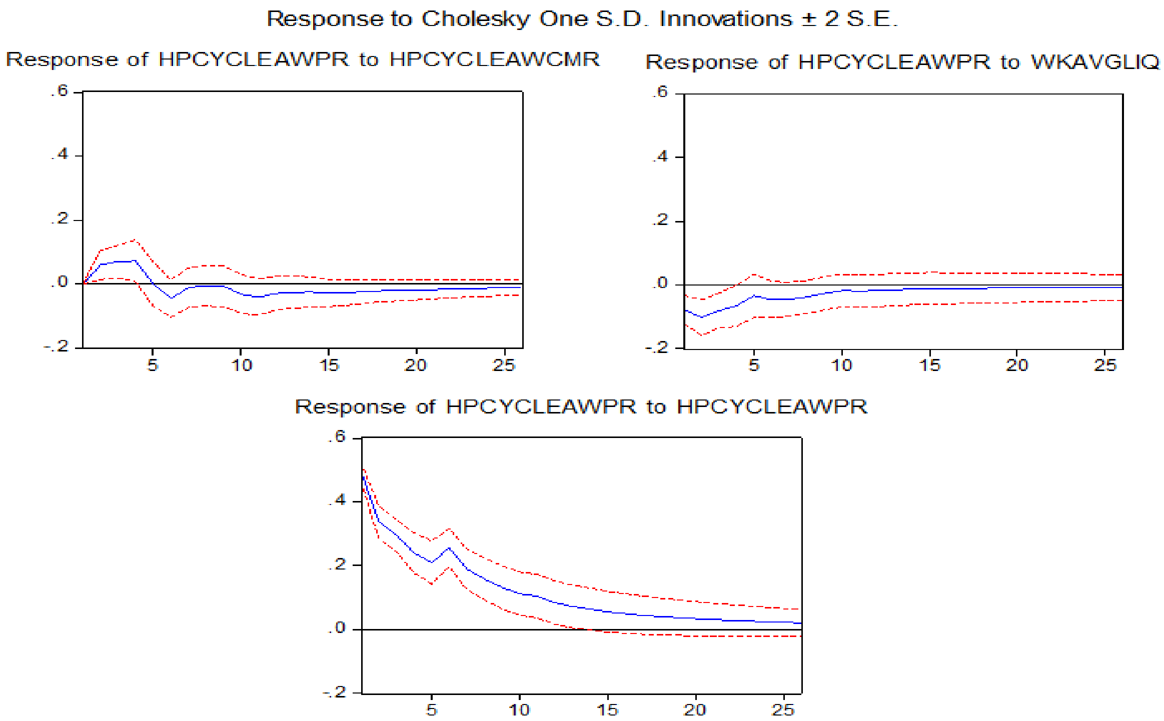


Figure-9. Impulse response of AWPR to shocks on AWCMR, Domestic Money Market Liquidity and AWPR
Source: Author's calculations based on CBSL data

AWPR declines somewhat immediately following a positive shock to domestic money market liquidity, peaks at lag two, and the effect dies down after about fifteen lags. The third graph shows the response of AWPR to an unexpected increase in the AWPR itself. The effect of the shock is significant and felt immediately, but stabilises only after about twenty lags, indicating that AWPR, itself, is one of its key determinants.

The variance decomposition over 26 weeks is presented in Figure 10. The variance decomposition offers information about the relative importance of each random innovation in affecting the dependent variable of AWPR in the estimated VAR model. As per the findings, about 4 per cent of the variance in AWPR is due to domestic money market liquidity, while AWPR itself accounts for about 92 per cent of the variance. However, the variance in AWPR due to AWCMR is relatively insignificant (about 2 per cent).

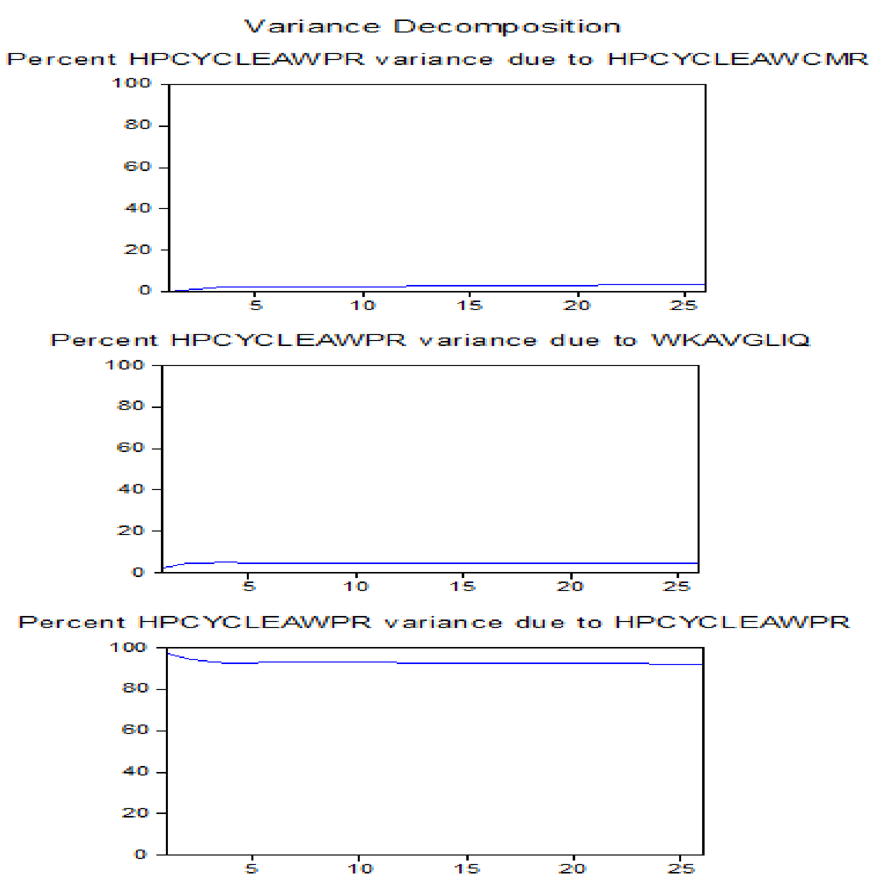


Figure-10. Variance Decomposition
Source: Author's calculations based on CBSL data

4.7. Presence of Asymmetries Tested Using Observations from Raw Data and Impulse Response Functions (IRFs)

Another important purpose of this study was to test for the presence of asymmetries in the adjustment of prime lending rates following changes in the monetary policy stance in Sri Lanka. A new data series on the Reverse Repurchase (Reverse Repo) rate[3] was used to aid this examination. It is denoted as REVREPO in this study.

Using the above data series on the Reverse Repurchase rate, along with the call money market rate and the prime lending rate, a basic analysis was done using raw data, while an attempt was made to test for the same using a VAR model and Impulse Response Functions (IRFs).

4.7.1. Observations from Raw Data

To identify the presence of asymmetric adjustment in the prime lending rate, the series of WKAWPR, WKAVGAWCMR and REVREPO was used. Based on the changes in the monetary policy stance in Sri Lanka, the sample period was segmented to policy cycles and assigned names to assist the study (Refer Table 10).

Table-10. Segmented Policy Cycles

Period	Type	Period Name
01/01/2004 - 11/11/2004	Easy	Easy 1
11/18/2004 - 02/05/2009	Tight	Tight 1
02/12/2009 - 02/02/2012	Easy	Easy 2
02/09/2012 - 12/06/2012	Tight	Tight 2
12/13/2012 - 06/27/2013	Easy	Easy 3

Source: Author's calculations based on CBSL data

Next, the movements of all the above variables were tracked, findings of which are shown in Table 11.

Table-11. Changes in Interest Rates during Monetary Policy Cycles

			in bps	
Period	**Reverse Repurchase Rate**	**AWCMR**	**AWPR**	**AWPR=(AWCMR) x**
Easy 1		+135	+53	0.4
Tight 1	+350	+543	+1052	1.9
Easy 2	-350	-540	-856	1.6
Tight 2	+125	+163	+276	1.7
Easy 3	-75	-195	-221	1.1

Source: Author's calculations based on CBSL data

Based on the outcome of the above exercise, a clear assessment on the results of the first cycle (i.e., Easy 1) cannot be done as the sample period in this study commences from January 2004 and there has been no change in the Reverse Repurchase rate since 01 January 2004 up until mid-November 2004, where steps were taken to tighten monetary policy, which is the starting point of the 'Tight 1' cycle. However, it can be noted that despite the first cycle being an 'Easy' cycle, both AWCMR and AWPR has risen quite significantly. With mounting inflation and monetary growth in 2004, the CBSL aggressively conducted open market operations (OMO), as a first step, to absorb the excess liquidity in the domestic money market, which induced an upward adjustment in the short-term market interest rates; hence the increase in both AWCMR and AWPR.

Subsequently, monetary policy was tightened further by way of increasing the policy interest rates in November 2004, and during the period of 'Tight 1', the Reverse Repurchase rate was increased gradually by 350 basis points up until the next easing cycle. During this period, AWCMR rose by 543 basis points, while AWPR rose by 1,052 basis points.

During the third cycle, 'Easy 2', the Reverse Repurchase rate was brought down by 350 basis points. Despite AWCMR declining by 540 basis points during this period, AWPR declined by only around 850 basis points, indicating the relative downward rigidity in the prime lending rate (when compared with 'Tight 1', where the change in the Reverse Repurchase rate is the same); an example of asymmetric adjustment.

In the following period (Tight 2), which is the shortest tightening cycle ever in Sri Lankan history, the Reverse Repurchase rate was raised by 125 basis points, whereas AWCMR and AWPR increased by 163 basis points and 276 basis points, respectively.

In the last monetary policy cycle, 'Easy 3', AWCMR and AWPR have reduced by 195 basis points and 221 basis points, respectively, in response to the reduction in the Reverse Repurchase rate (by 75 basis points).

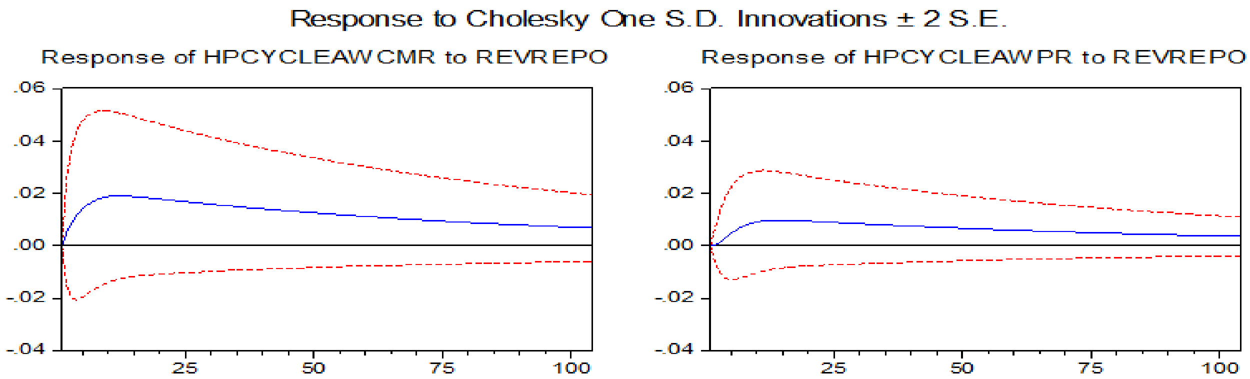
The final column of Table 11 indicates that during the easing cycles of monetary policy, the multiple of AWCMR is relatively lesser that during tightening cycles, signifying that the magnitude-wise adjustment by commercial banks during an interest rate rising setting is relatively higher than the interest rate relaxing setting. This indicates the presence of asymmetric adjustment of the prime lending rate to varying policy cycles.

4.7.2. Findings from VAR and IRFs

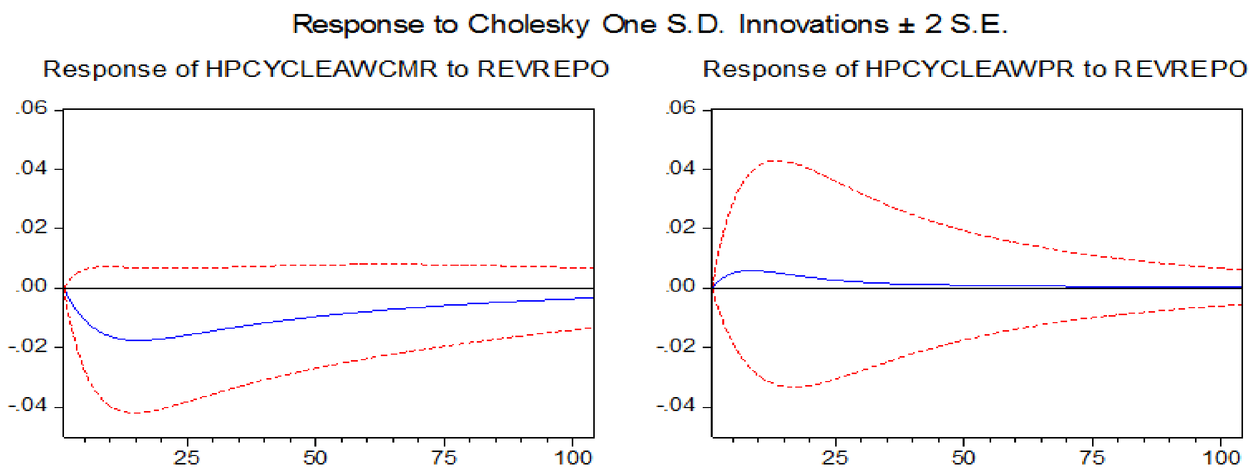
In this exercise to test for asymmetric adjustment in the prime lending rate, a VAR estimate was conducted for the different monetary policy cycle periods. However, the first and the last monetary policy cycles were not considered for this exercise as those were not full-cycle periods, as constrained by the chosen sample for this study. The chosen lag length was 1 based on VAR lag order selection criteria and following the VAR estimation, impulse response functions for those three cycles ('Tight 1', 'Easy 2' and 'Tight 2') were generated as shown in Figure 11.

[3] This is a key policy rate that forms the upper bound of the interest rate corridor for the call money market rate. It is the rate charged by the CBSL on overnight borrowing by commercial banks. In other words, it is the overnight lending rate of the CBSL. However, with effect from 2 January 2014, the Reverse Repurchase rate was renamed and is now known as the Standing Lending Facility Rate (SLFR).

(a) Tight 1



(b) Easy 2



(c) Tight 2

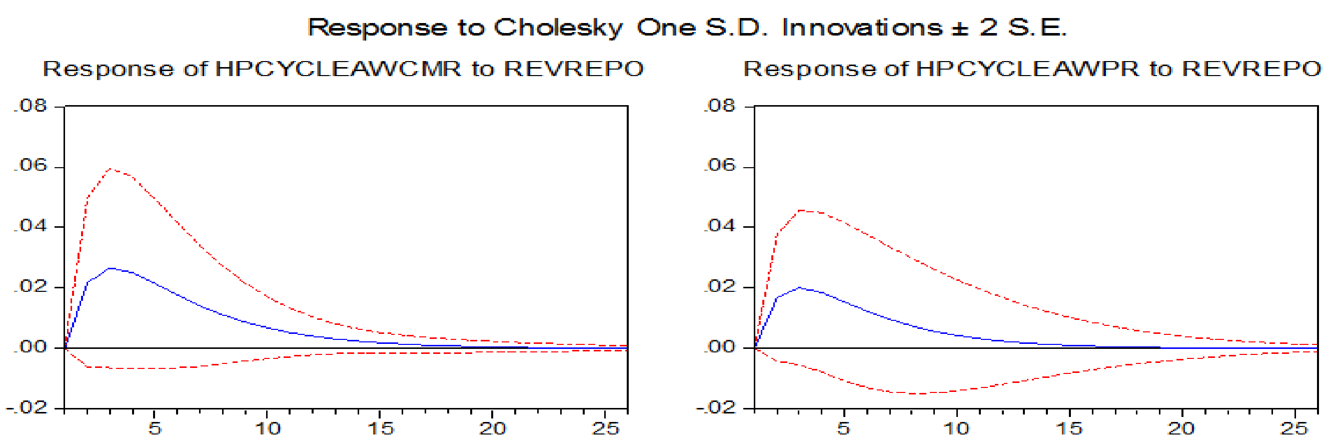


Figure-11. Impulse Responses of AWCMR and AWPR to shocks on the Reverse Repurchase Rate

Source: Author's calculations based on CBSL data

As per the above figure, during tightening policy cycles, the response of both HPCYLCEAWCMR and HPCYCLEAWPR to one-time shocks on the Reverse Repurchase Rate appears to be quite similar. However, in the easing policy cycle, HPCYCLEAWPR seems to rise till about lag 5 before adjusting down and moving towards the trend path, while HPCYCLEAWCMR declines almost immediately. This asymmetric adjustment could be attributed to the existence of persistence in the prime lending rate of Sri Lanka. However, it should be noted that this particular exercise was done with the limited available information and could prove spurious if a larger data sample was considered.

5. Conclusion and Policy Implications

This paper analyses the behaviour of the prime lending rate in Sri Lanka during the period January 2004 – June 2013. The main objective of this paper is to identify the determinants of the prime lending rate in Sri Lanka, with special focus to prime rate persistence and asymmetries.

This study was inspired by the growing interest on the attributes and importance of the prime lending rate among those in the private sector, commercial banks as well as the Central Bank. It was often argued that the prime lending rate, i.e., AWPR, outshined as the key benchmark lending rate, as opposed to the Sri Lanka Interbank Offered Rate (SLIBOR) earlier. The downward rigidness of AWPR during periods of easing monetary policy was often critiqued. This study reveals that in addition to the call money market rate being a key determinant of the prime lending rate in Sri Lanka, prime rate persistence, is also a major factor in the determination of the current week's AWPR. Results from this study confirmed this phenomenon. Although it could be considered acceptable for commercial banks to charge relatively higher rates of interest on prime lending during business troughs as a means of charging a premia on potential risk of default as observed by Dueker and Thornton (1994) and Dueker (2000) holding up the rates high with the motive of making and maximising short-term profits seem unacceptable as it could deter credit obtained by the private sector, thereby also affecting the long-term growth of the country. Also, increased prime rate persistence is likely to be a partial causal factor for the asymmetric adjustment in the prime lending rate to changes in the monetary policy stance in the nation.

Persistence in the prime lending rate, especially during policy easing cycles where market lending rates would be slow in adjusting downwards, will continue to be a phenomenon as long as it does not lead to loss of competitiveness of the respective banks. However, data reflects that the adjustment takes place gradually, although may not be fully.

The higher borrowing requirement of the government, especially witnessed towards the end of the sample period, could also be a reason for market lending rates, including the prime lending rate to not adjust downwards fully. A faster adjustment could have been possible had the government reliance on bank borrowings being less over the years, thereby facilitating a quicker and fuller pass through of monetary policy actions taken by the Central Bank.

Although OLS estimates state that domestic money market liquidity is an extremely weak and statistically insignificant determinant of the prime lending rate, it can be observed that since the global financial crisis, the spreads between AWPR and AWCMR have increased when overnight liquidity was at a balanced position. However, when overnight liquidity was high and in excess, market lending rates and their spreads narrowed. This suggests that it would be ideal if the economy could maintain an excess of about Rs. 15 – 25 billion in the overnight domestic money market, which would not only aid the economy and its stakeholders to enjoy low rates of interest, but would also help increase the affordability of credit, thereby increasing demand for credit by the private sector, which would subsequently lead to long term economic growth.

Alternatively, several measures could be taken to improve the computation of AWPR as the weekly computed rates are largely susceptible to transactions of large borrowers (where the prime rate could be relatively more volatile in their absence during a particular business week). Moreover, as highlighted in Section 1.2.2., only transactions exceeding Rs. 10 million are considered for the computation of AWPR. This could cause prime lending of relatively smaller amounts (Eg: Rs. 9 million) by small banks to be excluded from the computation of AWPR. This issue could also be addressed when a new computation methodology is designed.

Finally, this study could be extended to cover a larger sample period, while including any other explanatory variables. Also, basic econometric techniques were used when testing for asymmetries in this study. This could be further extended by using more advanced techniques such as ARCH/ GARCH, Ordered Probit or TAR/MTAR, which would be useful in observing asymmetric adjustments in the prime lending rate during various monetary policy cycles.

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Appendix-1 – Alternate Multiple Regression Models and their OLS Estimates

i. Model I:

$$HPCYCLEAWPR_t = \alpha_0 + \alpha_1 HPCYCLEAWCMR_t + \sum_{i=1}^{3} \alpha_2 HPCYCLEAWPR_{t-i} + \alpha_3 WKAVGLIQ_t + \alpha_4 DUMMYUP + \varepsilon_t \quad (6)$$

OLS Estimates of Model I

Dependent Variable: HPCYCLEAWPR
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.033492	0.032740	1.022962	0.3068
HPCYCLEAWCMR	0.235121	0.011367	20.68438	0.0000
HPCYCLEAWPR(-1)	0.533687	0.034191	15.60906	0.0000
HPCYCLEAWPR(-2)	0.083408	0.040524	2.058252	0.0401
HPCYCLEAWPR(-3)	0.098982	0.033270	2.975079	0.0031
WKAVGLIQ	-0.001389	0.000721	-1.925165	0.0548
DUMMYUP	-0.027959	0.038463	-0.726916	0.4676
R-squared	0.827491	Mean dependent var		-0.001067
Adjusted R-squared	0.825361	S.D. dependent var		0.892322
S.E. of regression	0.372899	Akaike info criterion		0.879080
Sum squared resid	67.58018	Schwarz criterion		0.938722
Log likelihood	-209.6933	Hannan-Quinn criter.		0.902498
F-statistic	388.5411	Durbin-Watson stat		1.672131
Prob(F-statistic)	0.000000			

Model II:

$$HPCYCLEAWPR_t = \alpha_0 + \alpha_1 HPCYCLEAWCMR_t + \sum_{i=1}^{3} \alpha_2 HPCYCLEAWPR_{t-i} + \alpha_3 WKAVGLIQ_t + \alpha_4 (DUMMYUP * HPCYCLEAWCMR_t) + \alpha_5 DUMMYUP + \varepsilon_t \quad (7)$$

OLS Estimates of Model II

Dependent Variable: HPCYCLEAWPR
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.004430	0.035255	-0.125668	0.9000
HPCYCLEAWCMR	0.111015	0.046001	2.413308	0.0162
HPCYCLEAWPR(-1)	0.533037	0.033957	15.69750	0.0000
HPCYCLEAWPR(-2)	0.082120	0.040248	2.040346	0.0419
HPCYCLEAWPR(-3)	0.095907	0.033060	2.900967	0.0039
WKAVGLIQ	-0.001167	0.000721	-1.619088	0.1061
DUMMYUP*HPCYCLEAWCMR	0.131905	0.047396	2.783016	0.0056
DUMMYUP	0.007834	0.040305	0.194364	0.8460
R-squared	0.830203	Mean dependent var		-0.001067
Adjusted R-squared	0.827752	S.D. dependent var		0.892322
S.E. of regression	0.370338	Akaike info criterion		0.867294
Sum squared resid	66.51792	Schwarz criterion		0.935456
Log likelihood	-205.7879	Hannan-Quinn criter.		0.894057
F-statistic	338.7639	Durbin-Watson stat		1.675623
Prob(F-statistic)	0.000000			

Appendix-2. VAR Estimates

Vector Autoregression Estimates

	HPCYCLEAWCMR	HPCYCLEAWPR	WKAVGLIQ
HPCYCLEAWCMR(-1)	0.487731	0.065730	0.493830
	(0.06781)	(0.02524)	(0.37976)
	[7.19311]	[2.60439]	[1.30037]
HPCYCLEAWCMR(-2)	0.126578	0.010851	0.135373
	(0.06650)	(0.02475)	(0.37243)
	[1.90352]	[0.43840]	[0.36348]
HPCYCLEAWCMR(-4)	-0.024470	-0.074717	0.645027
	(0.06921)	(0.02576)	(0.38763)
	[-0.35356]	[-2.90037]	[1.66402]
HPCYCLEAWCMR(-5)	0.026294	-0.044850	-0.209016
	(0.07205)	(0.02682)	(0.40356)
	[0.36492]	[-1.67226]	[-0.51793]
HPCYCLEAWCMR(-6)	0.034461	0.027217	-0.331251
	(0.06329)	(0.02356)	(0.35448)
	[0.54448]	[1.15533]	[-0.93447]
HPCYCLEAWPR(-1)	-0.211750	0.558659	-0.045427
	(0.17963)	(0.06686)	(1.00609)
	[-1.17878]	[8.35531]	[-0.04515]
HPCYCLEAWPR(-2)	0.189880	0.154478	-0.186369
	(0.18423)	(0.06857)	(1.03183)
	[1.03067]	[2.25273]	[-0.18062]
HPCYCLEAWPR(-4)	-0.054738	0.173032	-0.962634
	(0.18548)	(0.06904)	(1.03884)
	[-0.29511]	[2.50628]	[-0.92664]
HPCYCLEAWPR(-5)	0.428498	0.213369	0.757157
	(0.21076)	(0.07845)	(1.18040)
	[2.03314]	[2.71991]	[0.64144]
HPCYCLEAWPR(-6)	-0.472971	-0.233352	0.679687
	(0.16793)	(0.06251)	(0.94055)
	[-2.81645]	[-3.73321]	[0.72265]
WKAVGLIQ(-1)	-0.009814	-0.005451	0.922914
	(0.00836)	(0.00311)	(0.04682)
	[-1.17403]	[-1.75189]	[19.7133]
WKAVGLIQ(-2)	0.010653	0.005436	-0.040283
	(0.00977)	(0.00364)	(0.05471)
	[1.09056]	[1.49522]	[-0.73632]
WKAVGLIQ(-4)	-0.003124	0.001258	0.126524
	(0.00972)	(0.00362)	(0.05441)
	[-0.32159]	[0.34778]	[2.32526]
WKAVGLIQ(-5)	0.002703	-0.001757	-0.094245
	(0.01134)	(0.00422)	(0.06350)
	[0.23837]	[-0.41629]	[-1.48419]
WKAVGLIQ(-6)	-0.000291	0.000183	0.039502
	(0.00842)	(0.00313)	(0.04716)
	[-0.03452]	[0.05833]	[0.83758]
C	-0.111864	-0.037765	1.725674
	(0.12208)	(0.04544)	(0.68372)
	[-0.91635]	[-0.83112]	[2.52396]
DUMMYUP	0.202319	0.070872	-1.800806
	(0.14094)	(0.05246)	(0.78938)
	[1.43549]	[1.35096]	[-2.28130]
R-squared	0.329725	0.702169	0.924201
Adj. R-squared	0.307003	0.692073	0.921632
Sum sq. resids	842.0625	116.6635	26414.41
S.E. equation	1.335676	0.497160	7.480824
F-statistic	14.51176	69.54945	359.6895
Log likelihood	-826.7447	-343.4757	-1669.245
Akaike AIC	3.450899	1.474338	6.896709
Schwarz SC	3.596645	1.620085	7.042456
Mean dependent	-0.000245	-0.001410	16.47175
S.D. dependent	1.604485	0.895927	26.72268

Determinant resid covariance (dof adj.)	11.06347
Determinant resid covariance	9.949260
Log likelihood	-2643.321
Akaike information criterion	11.01972
Schwarz criterion	11.45696

Note: Standard errors in ( ) & t-statistics in [ ]